UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

CO-ORDINATED SCIENCES **0654/01**

Paper 1 Multiple Choice

May/June 2004

45 minutes

Additional Materials: Multiple Choice Answer Sheet
Soft clean eraser
Soft pencil (type B or HB is recommended)

READ THESE INSTRUCTIONS FIRST

Write in soft pencil.
Do not use staples, paper clips, highlighters, glue or correction fluid.
Write your name, Centre number and candidate number on the answer sheet in the spaces provided unless this has been done for you.

There are **forty** questions on this paper. Answer **all** questions.
For each question there are four possible answers **A**, **B**, **C**, and **D**. Choose the **one** you consider correct and record your choice in **soft pencil** on the separate answer sheet.

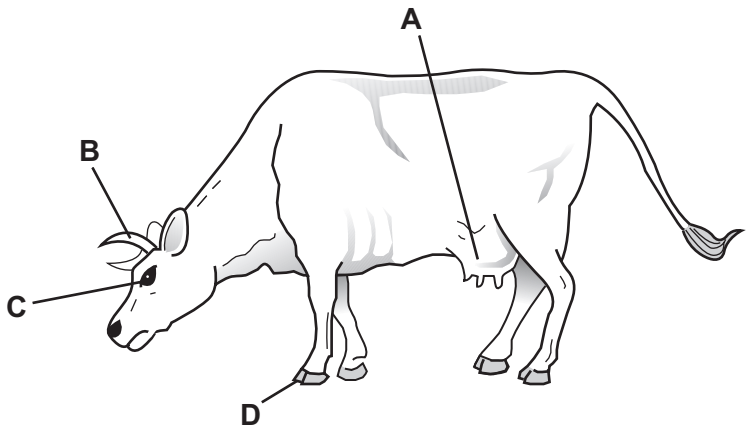
Read the instructions on the answer sheet very carefully.

Each correct answer will score one mark. A mark will not be deducted for a wrong answer.
Any rough working should be done in this booklet.
A copy of the Periodic Table is printed on page 20.

This document consists of **19** printed pages and **1** blank page.

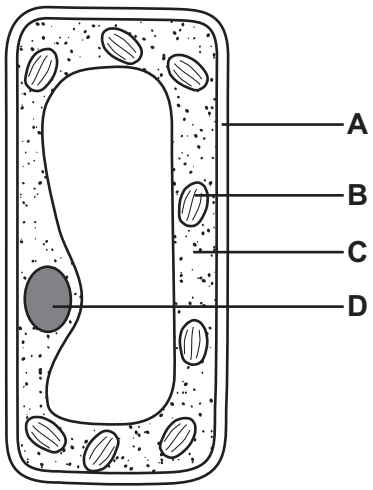
1 The diagram shows a mammal.

Which feature other than the presence of hair shows that it is a mammal?



2 The diagram shows a plant cell.

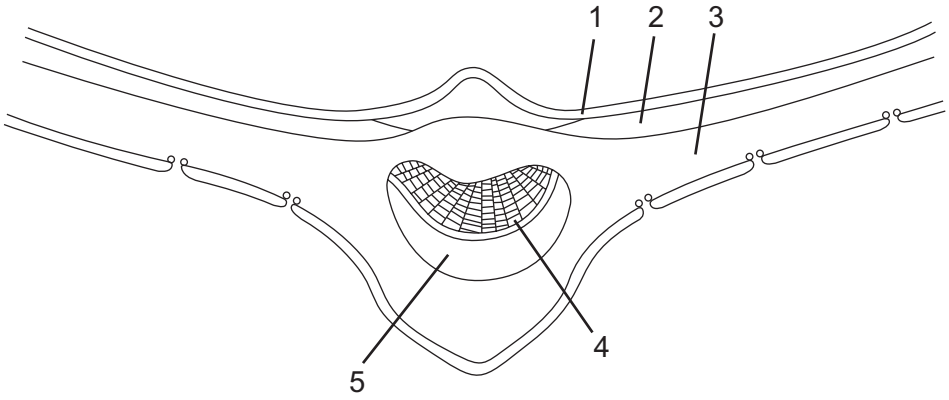
Which structure carries out photosynthesis?



3 What conditions are needed for a plant to have drooping leaves but not a drooping stem?

	enough water	lignin in stem
A	✓	✓
B	✓	✗
C	✗	✓
D	✗	✗

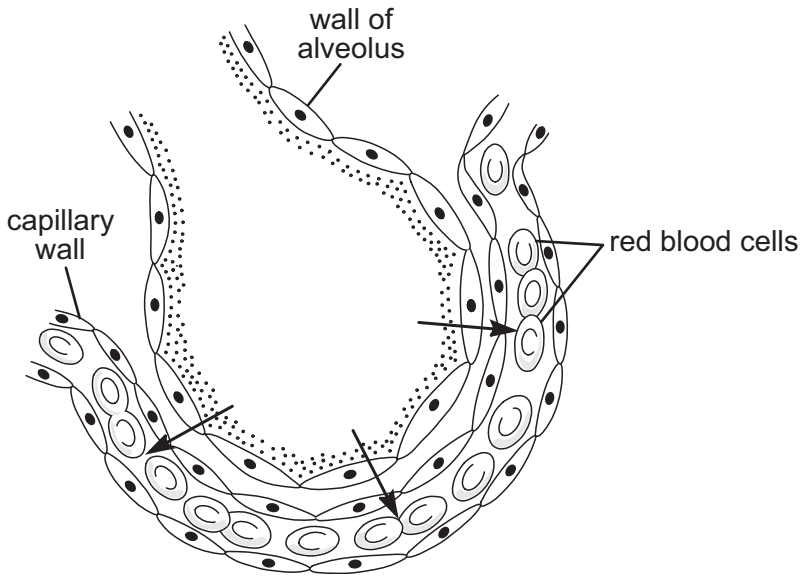
4 The diagram shows a cross section of a leaf.



In which two parts of the leaf does photosynthesis take place?

A 1 and 3 **B** 2 and 3 **C** 3 and 4 **D** 4 and 5

5 The arrows in the diagram show oxygen in the lungs moving from an alveolus into a blood capillary.



By what process does this movement take place?

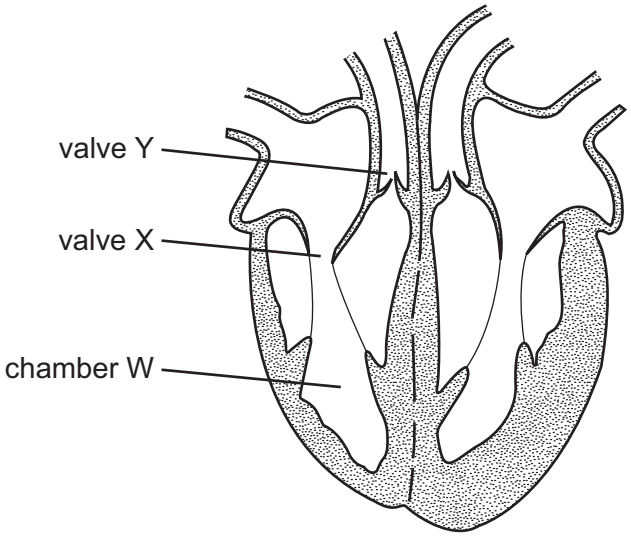
A breathing

B diffusion

C respiration

D transpiration

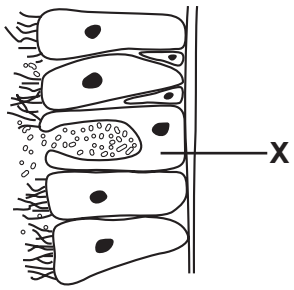
6 The diagram shows a section through the human heart.



What happens to valves X and Y when blood leaves chamber W?

	X	Y
A	closes	closes
B	closes	opens
C	opens	closes
D	opens	opens

7 The diagram shows part of the lining of the trachea.



What is **X**?

A cartilage

B cell of alveolus

C cilium

D goblet cell

8 Which substance is produced during anaerobic respiration of muscles?

A amino acid

B fatty acid

C glucose

D lactic acid

9 When farm animals are kept for meat production they are fed a special diet to increase their muscle growth.

Which nutrient is increased in the diet?

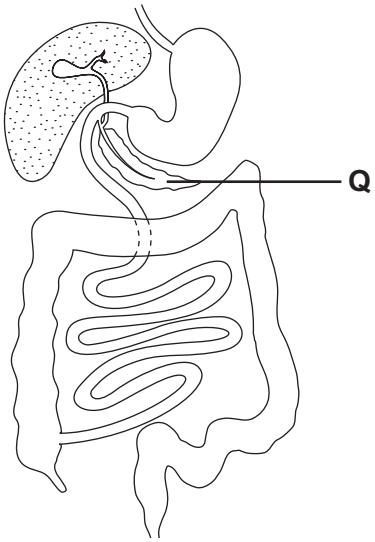
A carbohydrate

B fat

C protein

D vitamins

10 The diagram shows the human alimentary canal.



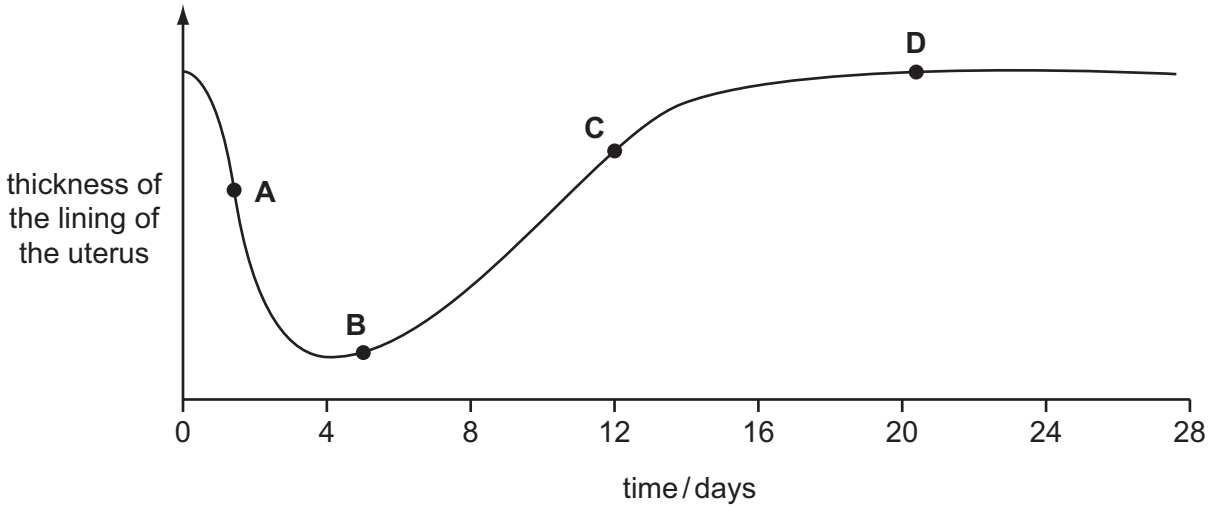
Proteases are produced by structure **Q**.

What is structure **Q** and what nutrient does protease digest?

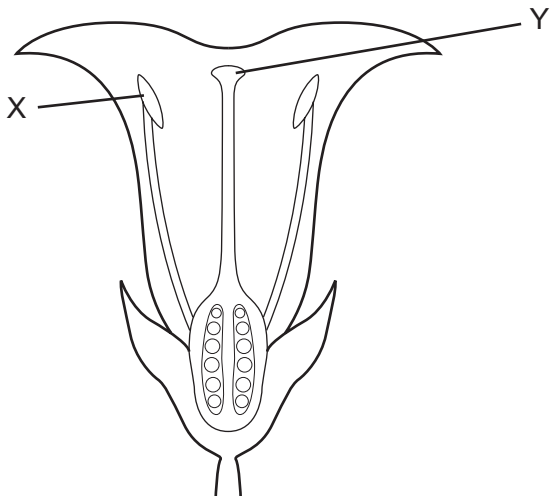
	structure **Q**	nutrient digested
A	liver	fat
B	liver	protein
C	pancreas	fat
D	pancreas	protein

11 The graph shows the changes that take place in the thickness of the uterus lining during a woman's menstrual cycle.

At which point is menstruation occurring?



12 The diagram shows a section through a flower.



Which process occurs when pollen is transferred from X to Y?

A dispersal

B fertilisation

C pollination

D reproduction

13 In a particular breed of dog, black coat colour is due to a dominant allele, B, and golden coat colour is due to the recessive allele, b.

A black dog, whose father was golden, is mated with a black bitch whose mother was golden.

What is the likelihood of one of their puppies being heterozygous?

A nil **B** 1 in 4 **C** 1 in 2 **D** 1 in 1

14 The element phosphorus burns in air, as shown.

$$4P + 5O_2 \rightarrow P_4O_{10}$$

What does the formula P_4O_{10} show?

A a mixture of atoms of two elements

B a mixture of molecules of two elements

C a molecule of a compound

D an atom of a compound

15 Which particle has the largest mass?

	protons	neutrons	electrons
A	5	6	7
B	6	6	6
C	6	7	7
D	7	7	6

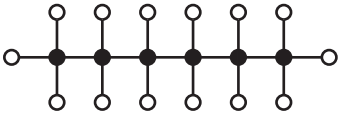
16 Which two elements are in the same group of the Periodic Table?

element	number of protons in an atom
1	9
2	10
3	16
4	17

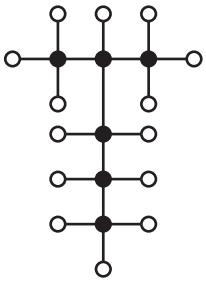
A 1 and 3 **B** 1 and 4 **C** 2 and 3 **D** 2 and 4

17 The diagrams show the structure of three molecules, **P**, **Q** and **R**.

P



Q

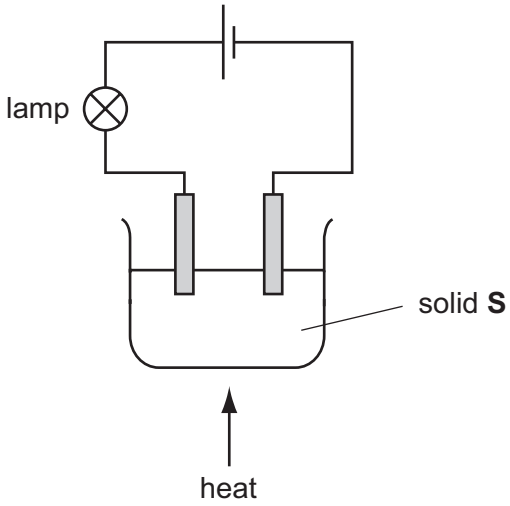


R

Which of these molecules could be carbon compounds?

	P	Q	R
A	✓	✓	✓
B	✓	✓	✗
C	✓	✗	✗
D	✗	✓	✓

18 The experiment shown is used to investigate the properties of a solid, **S**.



At first, the lamp does not light.

On heating, solid **S** melts and the lamp lights.

What type of solid is substance **S**?

A a compound of a metal and a non-metal

B a compound of two non-metals

C a metallic element

D a non-metallic element

19 When heated, a mineral decomposes.

The gas produced turns limewater milky.

What is the mineral?

A caliche, $NaNO_3$

B halite, $NaCl$

C limestone, $CaCO_3$

D zinc blende, ZnS

20 A sample of tap water is tested.

- When boiled, a precipitate forms.
- When dilute nitric acid is added, carbon dioxide is given off.
- When aqueous barium nitrate is added, a white precipitate forms.

What do these tests show about the tap water?

	it is hard	it contains sulphate ions
A	✓	✓
B	✓	✗
C	✗	✓
D	✗	✗

21 The pH of water changes when ammonia is bubbled into it.

What happens to the pH and why?

	the pH	ammonia is
A	decreases	acidic
B	decreases	alkaline
C	increases	acidic
D	increases	alkaline

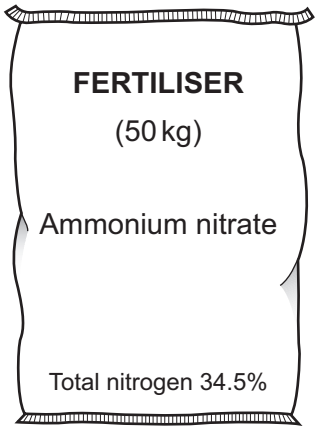
22 The following statement about the test for oxygen is incomplete.

Which words complete gaps 1 and 2?

When a …..1….. splint is placed in oxygen, the splint …..2…..

	1	2
A	burning	relights
B	burning	goes out
C	glowing	relights
D	glowing	goes out

23 The diagram shows a bag of fertiliser.



The fertiliser contains nitrogen.

Which other elements are used in fertilisers for healthy plant growth?

A carbon and oxygen

B carbon and sodium

C phosphorus and potassium

D potassium and sodium

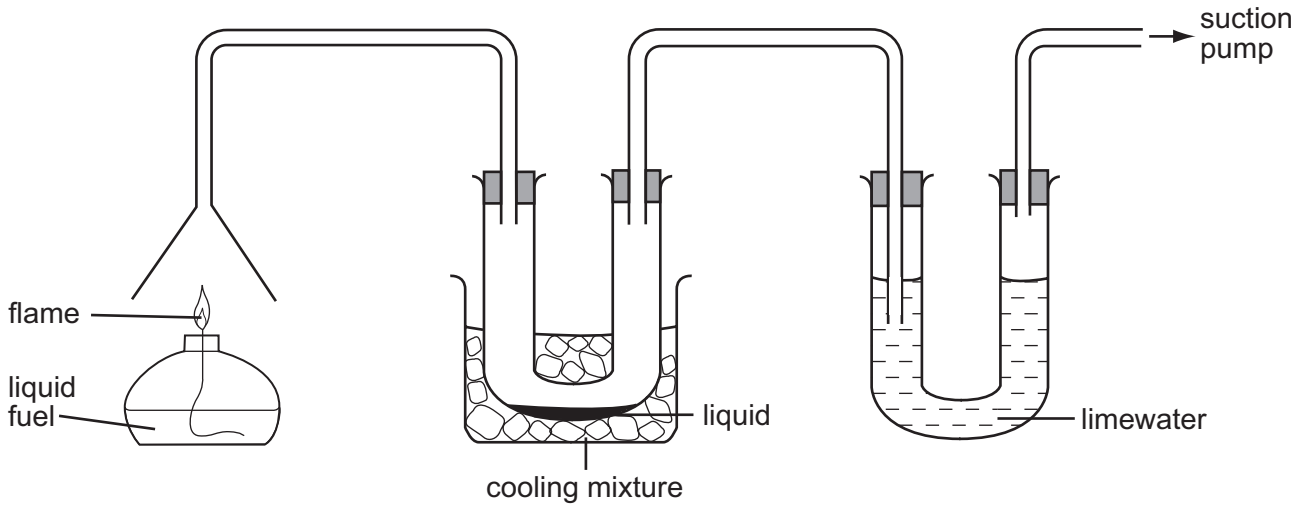
24 The sentence about chemicals from a natural source is incomplete.

Which words correctly fill the gaps 1 and 2?

The discovery of new …..1….. can result from the study of chemicals present in …..2…..

	1	2
A	alloys	air
B	drugs	plants
C	fertilisers	petroleum
D	proteins	rocks

25 A liquid fuel is burnt in the following experiment.



What is being tested for in the gases produced by the burning fuel?

A carbon monoxide and carbon dioxide

B carbon monoxide and water

C carbon dioxide and water

D carbon dioxide and sulphur dioxide

26 Which method is used to prevent the girders of a bridge from rusting?

A chromium plating

B coating with plastic

C galvanising

D painting

27 Lead has a high density of 11.3 g / cm^3 and lead(II) iodide is a bright yellow solid.

Which other property of lead explains why it is **not** an example of a transition metal?

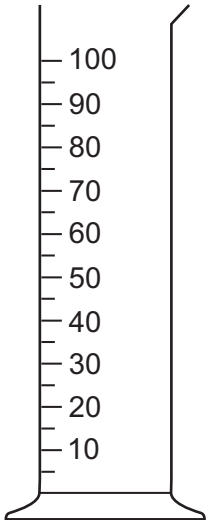
A Lead conducts electricity.

B Lead forms alloys.

C Lead melts at 327 °C.

D Lead(II) oxide is basic.

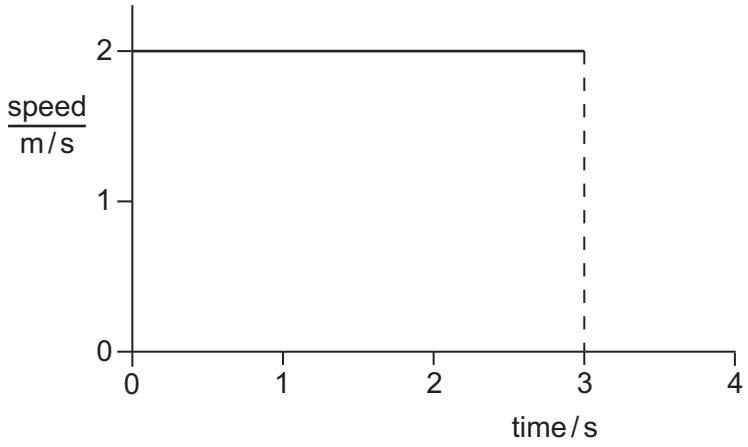
28 The diagram shows a measuring cylinder.



Which unit would be most suitable for its scale?

A mm^2 **B** mm^3 **C** cm^2 **D** cm^3

29 The diagram shows the speed-time graph for an object moving at constant speed.



What is the distance travelled by the object in the first 3 s?

A 1.5 m **B** 2.0 m **C** 3.0 m **D** 6.0 m

30 Which statement about the mass of a falling object is correct?

A It decreases as the object falls.

B It is equal to the weight of the object.

C It is measured in newtons.

D It stays the same as the object falls.

31 Which of the following is a unit of density?

A cm^3 / g

B g / cm^2

C g / cm^3

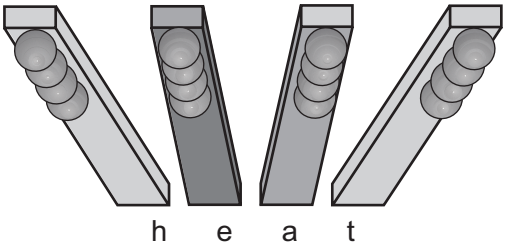
D kg / m^2

32 An experiment is set up to find out which metal is the best conductor of heat. Balls are stuck with wax to rods made from different metals, as shown in diagram X.

The rods are heated at one end. Some of the balls fall off, leaving some as shown in diagram Y.

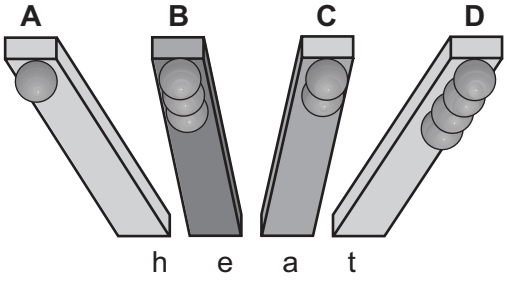
Which labelled metal is the best conductor of heat?

diagram X



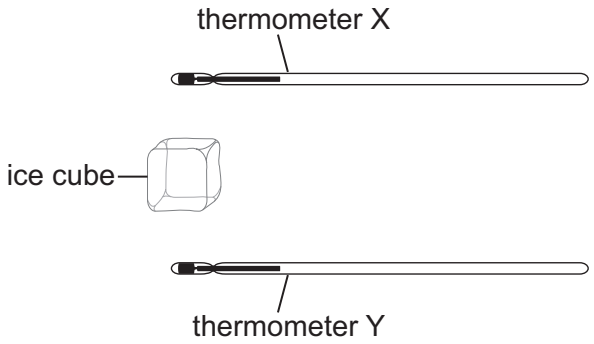
before heating

diagram Y



after heating

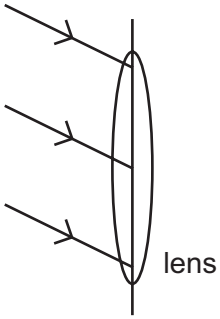
33 Thermometer X is held above an ice cube and thermometer Y is held the same distance below the ice cube. After several minutes, the reading on one thermometer changes. The ice cube does not melt.



Which thermometer reading changes and why?

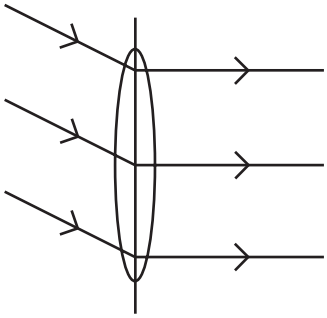
	thermometer	reason
A	X	cool air rises from the ice cube
B	X	warm air rises from the ice cube
C	Y	cool air falls from the ice cube
D	Y	warm air falls from the ice cube

34 Three rays of light fall on a converging lens as shown.

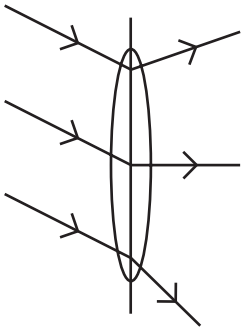


Which diagram shows the path of the rays after passing through the lens?

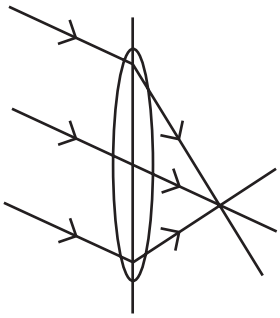
A



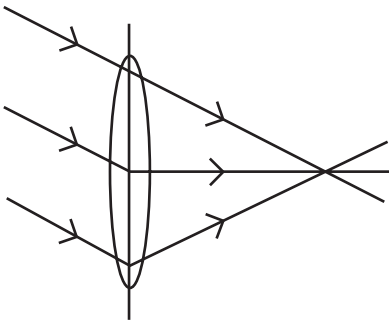
B



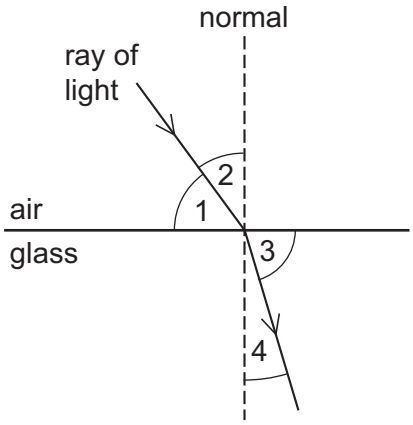
C



D



35 The diagram shows a ray of light entering a block of glass.

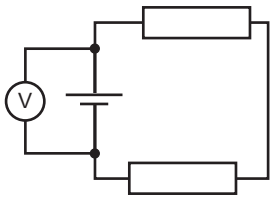


Which numbered angles are the angles of incidence and of refraction?

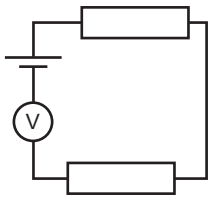
	angle of incidence	angle of refraction
A	1	3
B	1	4
C	2	3
D	2	4

36 Which circuit shows how a voltmeter is connected to measure the potential difference across the cell?

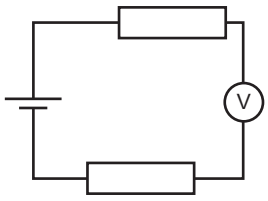
A



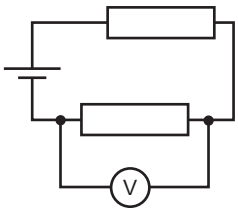
B



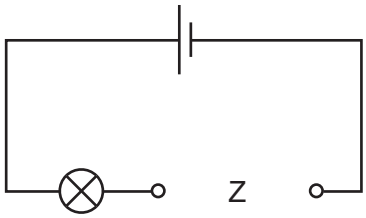
C



D



37 An electrical component is to be placed in the circuit at Z, to allow the brightness of the lamp to be varied from bright to dim.

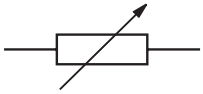


What should be connected at Z?

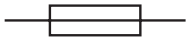
A

B

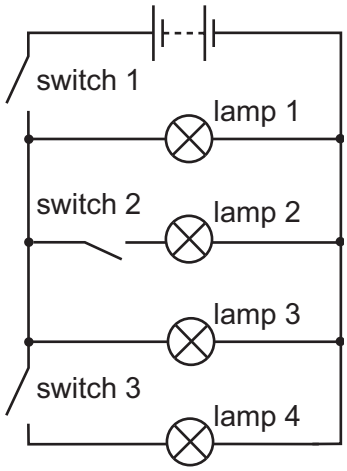
C



D



38 The circuit shown contains four lamps and three switches.



Which switches must be closed to light only lamps 1 and 3?

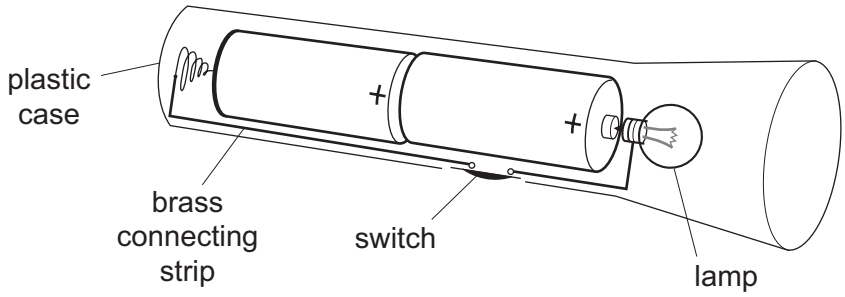
A switch 1 only

B switch 1 and switch 2 only

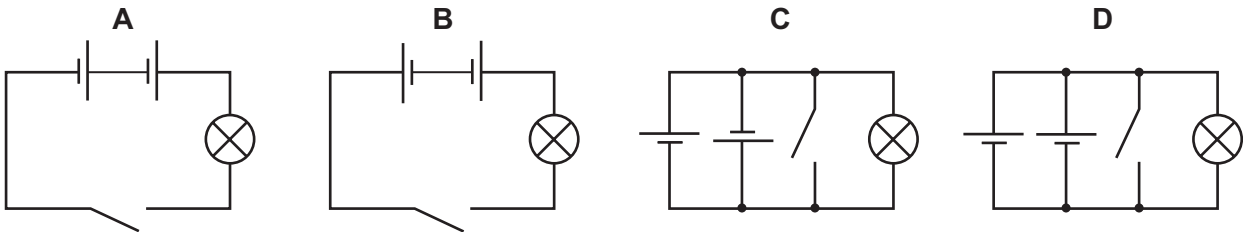
C switch 1 and switch 3 only

D switch 2 and switch 3 only

39 The diagram shows a torch containing two 2 V cells, a switch and a lamp.



What is the circuit diagram for the torch?



40 Which line correctly describes alpha radiation?

	electric charge	penetrates 1 cm of aluminium?
A	negative	yes
B	negative	no
C	positive	yes
D	positive	no

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DATA SHEET
The Periodic Table of the Elements

Group																	
I	II											III	IV	V	VI	VII	0
							1 H Hydrogen 1										4 He Helium 2
7 Li Lithium 3	9 Be Beryllium 4											11 B Boron 5	12 C Carbon 6	14 N Nitrogen 7	16 O Oxygen 8	19 F Fluorine 9	20 Ne Neon 10
23 Na Sodium 11	24 Mg Magnesium 12											27 Al Aluminium 13	28 Si Silicon 14	31 P Phosphorus 15	32 S Sulphur 16	35.5 Cl Chlorine 17	40 Ar Argon 18
39 K Potassium 19	40 Ca Calcium 20	45 Sc Scandium 21	48 Ti Titanium 22	51 V Vanadium 23	52 Cr Chromium 24	55 Mn Manganese 25	56 Fe Iron 26	59 Co Cobalt 27	59 Ni Nickel 28	64 Cu Copper 29	65 Zn Zinc 30	70 Ga Gallium 31	73 Ge Germanium 32	75 As Arsenic 33	79 Se Selenium 34	80 Br Bromine 35	84 Kr Krypton 36
85 Rb Rubidium 37	88 Sr Strontium 38	89 Y Yttrium 39	91 Zr Zirconium 40	93 Nb Niobium 41	96 Mo Molybdenum 42	Tc Technetium 43	101 Ru Ruthenium 44	103 Rh Rhodium 45	106 Pd Palladium 46	108 Ag Silver 47	112 Cd Cadmium 48	115 In Indium 49	119 Sn Tin 50	122 Sb Antimony 51	128 Te Tellurium 52	127 I Iodine 53	131 Xe Xenon 54
133 Cs Caesium 55	137 Ba Barium 56	139 La Lanthanum 57 *	178 Hf Hafnium 72	181 Ta Tantalum 73	184 W Tungsten 74	186 Re Rhenium 75	190 Os Osmium 76	192 Ir Iridium 77	195 Pt Platinum 78	197 Au Gold 79	201 Hg Mercury 80	204 Tl Thallium 81	207 Pb Lead 82	209 Bi Bismuth 83	Po Polonium 84	At Astatine 85	Rn Radon 86
Fr Francium 87	226 Ra Radium 88	227 Ac Actinium 89															

140 Ce Cerium 58	141 Pr Praseodymium 59	144 Nd Neodymium 60	Pm Promethium 61	150 Sm Samarium 62	152 Eu Europium 63	157 Gd Gadolinium 64	159 Tb Terbium 65	162 Dy Dysprosium 66	165 Ho Holmium 67	167 Er Erbium 68	169 Tm Thulium 69	173 Yb Ytterbium 70	175 Lu Lutetium 71
232 Th Thorium 90	Pa Protactinium 91	238 U Uranium 92	Np Neptunium 93	Pu Plutonium 94	Am Americium 95	Cm Curium 96	Bk Berkelium 97	Cf Californium 98	Es Einsteinium 99	Fm Fermium 100	Md Mendelevium 101	No Nobelium 102	Lr Lawr 10

*58-71 Lanthanoid series
90-103 Actinoid series

Key: a = relative atomic mass; X = atomic symbol; b = proton (atomic) number

The volume of one mole of any gas is 24 dm^3 at room temperature and pressure (r.t.p.).